

between 4 and 5.20 p. m. of the 8th, during which considerable hail fell. At a point of five miles west of this place the hail-stones are reported to have been as large as hens' eggs, and caused much damage to corn and wheat.

Clear Creek, Saunders county, Nebraska.—A severe hail storm occurred five miles south of this place on the 13th, causing much damage to the growing corn.

Bismarck, Dakota.—Heavy hail fell at this station between 5.38 and 5.40 p. m. of the 18th. At points north and east of here considerable damage was done to the grain fields.

Niagara, Dakota.—A severe hail storm occurred south of this place at about 4 a. m. of the 19th. The storm passed from the southern edge of Devil's lake northeastward between this place and Larimore. The wheat crop suffered serious injury on Forest river and in Elk valley.

Very large hail accompanied the storm of the night of the 7-8th, in Iowa, which is described under the heading "local storms."

Hail storms of less severity have been reported from the various states as follows:

- Arizona.—Fort Thomas, 9th; Fort Grant, 25th.
- Arkansas.—Lead Hill, 1st.
- Colorado.—Fort Garland, 23d, 25th.
- Connecticut.—Southington, 1st, 8th, 19th, 23d.
- Dakota.—Alexandria, 17th; Deadwood, 14th; Fort Hale, 8th; Fort Sisseton, 28th; Fort Totten, 17th, 18th.
- Georgia.—Atlanta, 13th.
- Iowa.—Guttenburg, 10th.
- Minnesota.—Moorhead, 27th.
- Nebraska.—Clear Creek, 8th; De Soto, 7th; Utica, 8th, 11th.
- New Hampshire.—Contcookville, 20th.
- New Mexico.—Fort Union, 12th.
- New York.—Albany, 19th; Ardenia, 13th; Friendship, 18th; New York City, 19th.
- Pennsylvania.—Wellsboro', 23d.
- Tennessee.—Austin, 15th; Milan, 1st, 15th.
- Texas.—Fort Concho, 22d.
- Wisconsin.—Beloit, 27th.

SNOW.

Fort Collins, Colorado.—Light snow fell at this place during the early morning of the 1st.

Fort Shaw, Montana.—Heavy rain fell during the afternoon of the 21st, changing to snow at 6.15 p. m., which continued for thirty-five minutes.

Snow fell on the summit of Pike's Peak, Colorado, on the 2d, 3d, 4th, and from the 9th to 12th.

SLEET.

On the summit of Pike's Peak, Colorado, sleet was reported on the following dates: 1st to 5th, 8th, 9th, 11th, 12th, 15th, 25th, 27th, 28th.

Table of rainy and cloudy days, relative humidity, and dew-point for Aug., 1883.

Districts.	Rainy days.	Cloudy days.	Rel. humidity. %	Dew-point.
			Percentages.	°
New England.....	From 7 to 12	From 1 to 6	From 66.6 to 79.6	From 55.1 to 62.2
Middle Atlantic states.....	" 5 " 10	" 3 " 4	" 60.8 " 83.2	" 54.4 " 66.8
South Atlantic states.....	" 10 " 17	" 2 " 12	" 61.6 " 82.6	" 61.3 " 73.7
Florida peninsula.....	" 10 " 18	" 3 " 4	" 71.3 " 77.1	" 72.1 " 74.3
East Gulf.....	" 8 " 16	From 0 to 3	" 69.1 " 77.1	" 68.5 " 72.8
West Gulf.....	" 4 " 10	" 0 " 6	" 65.0 " 75.6	" 66.2 " 73.8
Ohio valley.....	" 4 " 13	" 3 " 5	" 61.6 " 68.9	" 54.9 " 59.6
Tennessee.....	" 9 " 17	" 3 " 4	" 72.1 " 76.4	" 62.1 " 66.4
Lower lakes.....	" 8 " 12	" 3 " 6	" 64.7 " 72.1	" 54.2 " 57.5
Upper lakes.....	" 5 " 13	" 1 " 8	" 67.1 " 77.9	" 49.9 " 57.1
Extreme northwest.....	" 9 " 11	" 3 " 5	" 66.7 " 81.8	" 51.9 " 54.2
Upper Mississippi valley.....	" 5 " 12	" 2 " 9	" 66.0 " 71.4	" 55.4 " 62.7
Missouri valley.....	" 8 " 16	" 4 " 7	" 68.4 " 78.1	" 56.8 " 62.7
Northern slope.....	" 2 " 15	" 1 " 14	" 40.6 " 72.2	" 35.0 " 59.2
Middle slope.....	" 8 " 12	" 0 " 9	" 48.6 " 58.0	" 37.8 " 56.8
Southern slope.....	" 4 " 8	" 0 " 9	" 50.7 " 56.5	" 37.8 " 61.0
Southern plateau.....	" 5 " 20	" 0 " 5	" 42.3 " 65.6	" 33.6 " 59.8
Northern plateau.....	" 1 " 2	" none	" 46.9 " 48.3	" 45.9 " 49.0
North Pacific.....	" 1 " 4	From 0 to 7	" 63.0 " 71.9	" 48.6 " 52.8
Middle Pacific.....	" 0 " 1	" 0 " 6	" 33.7 " 89.2	" 45.2 " 54.4
South Pacific.....	" 0 " 5	" 0 " 3	" 49.8 " 76.4	" 38.6 " 67.4
Mt. Washington, N. H.....	Sixteen	none	92.0	41.6
Pike's Peak, Col.....	Fifteen	One	73.5	30.3
Salt Lake City, Utah.....	Seven	Three	35.4	45.6

• Relative humidity corrected for altitude.

COTTON REGION REPORTS.

Temperature and rainfall observations in the cotton region were continued during August, 1883. The averages for the various districts are determined from observations made at the stations, as shown on chart vi., issued with the REVIEW for April, 1882. For the purpose of comparison, the averages for August, 1882, and those for August, 1883, with the departures, are given in the table below:

Meteorological Record of the Cotton Districts for the months of August, 1882 and 1883.

Districts.	Average rainfall in inches.			Temperatures.						Extremes for Aug., 1883.	
	1882.	1883.	Departures.	Mean of the maxima.			Mean of the minima.			Max.	Min.
				1882.	1883.	Change.	1882.	1883.	Change.		
New Orleans.....	8.38	2.70	— 5.68	89.8	90.9	+ 1.1	72.0	70.4	— 1.6	103	55
Savannah.....	6.21	5.54	— 0.57	90.6	91.0	+ 0.4	71.0	71.4	+ 0.4	105	62
Charleston.....	6.12	5.66	— 0.46	90.4	90.0	— 0.4	68.9	68.5	— 0.4	100	54
Atlanta.....	5.99	5.03	— 0.96	85.7	89.0	+ 3.3	67.5	67.0	— 0.5	99	51
Wilmington.....	6.24	2.90	— 3.28	87.8	88.7	+ 0.9	67.8	67.5	— 0.3	108	49
Memphis.....	4.30	3.41	— 0.89	87.1	87.5	+ 0.4	67.2	65.0	— 2.2	98	50
Galveston.....	5.44	0.93	— 4.49	91.7	96.3	+ 4.6	70.2	73.4	+ 3.2	106	61
Vicksburg.....	4.66	2.60	— 2.06	89.1	92.5	+ 3.4	69.6	69.8	+ 0.2	99	55
Montgomery.....	4.01	3.16	— 0.85	88.6	92.2	+ 3.6	68.7	68.7	0.0	99	47
Augusta.....	4.26	3.13	— 1.13	88.4	90.4	+ 2.0	68.8	68.1	— 0.7	102	51
Little Rock.....	3.44	3.41	— 0.03	88.3	91.9	+ 3.6	65.3	65.6	+ 0.3	103	54
Mobile.....	3.96	2.32	— 1.64	90.2	93.7	+ 3.5	70.0	68.9	— 1.1	103	48

From the above table it will be seen that, as in the preceding month, the average rainfall of August, 1883, is below that of August, 1882, the deficiencies being largest in the districts of New Orleans and Galveston, where they are 5.68 and 4.49, respectively. The means of the maxima temperatures for August, 1883, have been higher in all districts except for the district of Charleston, while the means of minima temperatures differ but little from those of August, 1882.

WINDS.

The most frequent directions of the wind during the month of August, 1883, at the Signal Service stations are shown on chart iii., by arrows flying with the wind. Over the greater part of the country they were variable; in Tennessee, the south Atlantic and east Gulf states, they were mostly from the northeast; in Texas and the Ohio valley, they were southerly; on the north Pacific coast, they were northerly; and on the California coast, they were from the west and northwest.

TOTAL MOVEMENTS OF THE AIR.

[In miles.]

In the following table are given the stations reporting the largest and smallest total movements of the air in each of the various districts:

Districts.	Stations reporting largest.	Miles.	Stations reporting smallest.	Miles.
New England.....	Block Island, R. I.....	9,452	New London, Conn.....	3,233
Middle Atlantic states.....	Barneget City, N. J.....	10,046	Lynchburg, Va.....	2,240
South Atlantic states.....	Hatteras, N. C.....	11,301	Augusta, Ga.....	2,329
Florida peninsula.....	Cedar Keys.....	5,492	Sanford.....	3,641
East Gulf.....	Pensacola, Fla.....	4,631	New Orleans, La.....	2,275
West Gulf.....	Indianola, Tex.....	6,710	Fort Smith, Ark.....	2,401
Ohio valley.....	Louisville, Ky.....	4,660	Indianapolis.....	3,545
Tennessee.....	Memphis.....	3,512	Chattanooga.....	3,087
Lower lakes.....	Sandusky, Ohio.....	7,597	Cleveland, Ohio.....	4,985
Upper lakes.....	Milwaukee, Wis.....	7,093	Duluth, Minn.....	4,239
Extreme northwest.....	Fort Buford, Dak.....	6,696	Saint Vincent, Minn.....	4,296
Upper Mississippi valley.....	Saint Louis, Mo.....	5,347	Dubuque, Ia.....	3,237
Missouri valley.....	Huron, Dak.....	6,420	Omaha, Neb.....	1,621
Northern slope.....	North Platte, Neb.....	6,000	Deadwood, Dak.....	2,533
Middle slope.....	West Las Animas, Col.....	5,583	Denver, Col.....	4,409
Southern slope.....	Fort Stockton, Tex.....	5,976	Coleman City, Tex.....	4,056
Southern plateau.....	Fort Apache, Ariz.....	4,138	El Paso, Tex.....	2,694
Northern plateau.....	Dayton, Wash.....	3,771	Spokane Falls, Wash.....	2,557
North Pacific.....	Portland, Oregon.....	2,289	Olympia, Wash.....	1,371
Middle Pacific.....	San Francisco, Cal.....	9,029	Red Bluff, Cal.....	3,695
South Pacific.....	Los Angeles, Cal.....	3,924	Yuma, Arizona.....	3,524

On the summits of Mount Washington, New Hampshire, and Pike's Peak, Colorado, the total movements of the air were 25,550, and 9,268, miles, respectively.

HIGH WINDS.

On the summit of Mount Washington, New Hampshire,